



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/980,858 | 02/26/2002 | Jakob Stoustrup | 0459-0688P | 3266 |

30593 7590 05/14/2003
HARNESSE, DICKEY & PIERCE, P.L.C.
P.O. BOX 8910
RESTON, VA 20195

EXAMINER

LE, JOHN H

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

2863

DATE MAILED: 05/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/980,858

Applicant(s)

STOUSTRUP ET AL.

Examiner

John H Le

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 14, 15, 19-37, 41, 42, 45 and 51-56 is/are rejected.
- 7) ☒ Claim(s) 12, 13, 16-18, 38-40, 43, 44 and 46-50 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☒ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,5,8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Denmark on 06/09/1999. It is noted, however, that applicant has not filed a certified copy of the DENMARK PA 1999 00817 06/09/1999 application as required by 35 U.S.C. 119(b).

Specification

2. The following guidelines illustrate the preferred layout and content for patent applications. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

The following order or arrangement is preferred in framing the specification and, except for the reference to "Microfiche Appendix" and the drawings, each of the lettered items should appear in upper case, without underlining or bold type, as section headings. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) Title of the Invention.
- (b) Cross-References to Related Applications.
- (c) Statement Regarding Federally Sponsored Research or Development.
- (d) Reference to a "Microfiche Appendix" (see 37 CFR 1.96).
- (e) Background of the Invention.
 - 1. Field of the Invention.
 - 2. Description of the Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) Brief Summary of the Invention.
- (g) Brief Description of the Several Views of the Drawing(s).
- (h) Detailed Description of the Invention.
- (i) Claim or Claims (commencing on a separate sheet).
- (j) Abstract of the Disclosure (commencing on a separate sheet).
- (k) Drawings.
- (l) Sequence Listing (see 37 CFR 1.821-1.825).

3. The disclosure is objected to because of the following informalities:

Art Unit: 2863

Heading for each section of specification should be provided (Related Art, Background, Brief Description of the Figures, Detail Description, Abstract of the Disclosure).

Drawings

4. The drawings are objected to under 37 CFR 1.84 for the reasons set forth by the draftsman. See attached PTO-948 form for details. Correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 19-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Altes (USP 4,042,928).

Regarding claim 1, Altes teaches a broad band transmitted radiation function mathematically denoted as $U(\omega)$ in the frequency domain. Altes discloses the steps of emitting a first output signal by an electronic signal generator 11 drives a transducer 13, which read on means of a first emitter, the first output signal being deterministic and containing an interval of frequencies, receiving a first input signal by a receiving transducer 21 which converts the radiation into electronic signals which are then processed by a receiver 23, which read on means of a first receiver (Fig.1)(Col.3, lines 26-40), determining a

Art Unit: 2863

transformed first input signal by transforming said first input signal by means of a predetermined linear transform (Col.2, lines 54-59), determining a first channel gain by means of comparison of said transformed first input signal and a predetermined original first signal being equal to said first output signal being emitted (Col.12, lines 18-34) and received noiselessly with a known channel gain and being transformed by means of said linear transform (Col.11, lines 17-47).

Regarding claims 19-22, Altes teaches the step of emitting an output signal by emitting an electromagnetic output signal and receiving a input signal by receiving an electromagnetic input signal (Col.2, lines 32-42/Col.3, lines 48-60), the step of emitting an output signal by emitting an acoustic output signal and receiving a input signal by receiving an acoustic input signal (Col.2, lines 34-36), the transforming of the input signal and the comparison of the transformed input signal and a predetermined original signal is performed by means of digital processing means (Col.7, lines 21-45).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2863

8. Claims 2-6, 10, 14, 17, 19-24, 28-37, 39, 51-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Altes (USP 4,042,928) in view of Barrett (USP 5,486,833).

Regarding claims 28-32, 52, Altes teaches the method for transmitting signals, the method comprising the steps of selecting an output signal from a predetermined set of output signals (Col.7, lines 21-38), emitting the selected output signal by means of the emitter, receiving an input signal by means of a receiver, determining a transformed input signal by transforming said input signal by means of a predetermined linear transform, comparing the transformed input signal with a predetermined set of original signals, each of said original signals being equal to one of said output signals of the predetermined set of output signals being emitted and received noiselessly with a known channel gain and being transformed by means of said linear transform as discussed in claim 1 above.

Altes fails to disclose a plurality of emitters, a plurality of receivers, a plurality of channels, and step of identifying the selected first output signal from said comparison.

Barrett teaches a plurality of emitters (Col.2, lines 48-53), a plurality of receivers (Col.14, lines 60-67), a plurality of channels (Col.2, lines 14-19), and step of identifying the selected the output signal from said comparison (Col.30, line 62-Col.31, line 18).

Regarding claims 2-10, 14,15, 18, 24-26, Barrett teaches step of determining a transformed first input signal further comprises the step of

Art Unit: 2863

transforming said first input signal by means of at least a second predetermined linear transform (Col.8-48), step of determining a transformed first input signal is performed by using a linear transform of full rank (Col.13, lines 1-10), the step of determining a transformed first input signal is performed by using a convolution transform (Col.7, lines 45-48), the step of determining a transformed first input signal is performed by using a spectral transform (Col.12, lines 49-65/Col.46, lines 60-65), the step of determining a transformed first input signal is performed by using a spread spectrum transform (Col.11, lines 30-32), the step of determining a transformed first input signal is performed by using a sine or cosine transform, the step of determining a transformed first input signal is performed by using a local sine or local cosine transform (Col.16, lines 1-29/Col.22, lines 29-67), the step of determining a transformed first input signal by using a unitary transform (Col.2, lines 3-7), the step of determining a transformed first input signal is performed by using a wavelet transform (Col.38, lines 41-49), the step of transforming the predetermined original first signal by means of a linear transform being the inverse transform of the predetermined linear transform (Col.22, lines 53-67),), the step of determining the original first signal from an obtained measure of noise applied to the first input signal (Col.23, lines 12-67), the step of reflecting the output signal using an object, the step being performed prior to the step of receiving a input signal, the step of transmitting the output signal using an object, the step being performed prior to the step of receiving a input signal, the step of obtaining information about the object (Col.14, lines 1-42).

Art Unit: 2863

Regarding claims 33-37, Barrett teaches the predetermined original signals are orthogonal (Col.13, lines 6-19/Col.28, lines 14-15), the step of emitting a plurality of output signals is performed by emitting signals being significant for each of the plurality of emitters (Col.9, lines 44-49), the step of determining the position of an object based upon the determined channel gains (Col.24, lines 57-67), the position of the object is determined in three dimensions (Col.9, lines 39-49), the step of reflecting the emitted signals by the object (Col.9, lines 60-67).

Regarding claim 51, Barrett teaches the absolute temperature of the resistor connected across its input terminals times the width of the band of frequencies passed by the receiver (Col.23, lines 24-28).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a plurality of emitters, a plurality of receivers, a plurality of channels, and step of identifying the selected the output signal from said comparison as taught by Barrett in a broad band transmitted radiation of Altes for the purpose of providing a signalling system which optimally penetrates media and resolves, detects, and discriminates targets with high accuracy by using wave packet signals, which are precisely defined in both the time and the frequency domain, rather than primarily in the frequency domain, or primarily in the time domain (Barrett, Col.1, lines 57-63).

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Altes (USP 4,042,928) in view of Opitz (USP 4,641,138).

Regarding claim 11, Altes fails to teach the step of determining a transformed first input signal by using a Hadamard transform.

Opitz teaches the step of determining a transformed first input signal by using a Hadamard transform (Col.4, lines 3-30).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include step of determining a transformed first input signal by using a Hadamard transform as taught by Opitz in a broad band transmitted radiation of Altes for the purpose of providing a radar apparatus which provides type-identification of an agitated or vibrating multipart reflective target (Opitz, Col.1, lines 30-32)

10. Claims 27, 41-42, 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Altes (USP 4,042,928) in view of Barrett (USP 5,486,833) as applied to claims 1, 24, 26, 32, 35 above, and further in view of Bullister (USP 6,172,665).

Regarding claim 27, the combination of Altes and Barrett taught supra, discussed the claimed invention excepted the step of obtaining information about the object comprises obtaining information regarding at least part of a human being.

Bullister teaches pointing device providing an interface between a user and a computer for the input of two- and three-dimensional spatial coordinates, and to a method of measuring rotations from the sensing ball and transforming them into rotations about standard Cartesian coordinates (Col.1, lines 11-16). In view of the fact that typical rotation sensitivities of trackballs are measured in

Art Unit: 2863

thousandths of an inch, this transformation error is not significant in comparison to that introduced by the human hand (Col.12, lines 20-23).

Regarding claims 41-42, 45, Bullister teaches step of determining the motion of the object (Col.17, lines 15-48), determining the spatial orientation of the object (Col.1, lines 11-16), determining the distance between the emitter and each of the receivers, and determining the position of the emitter by combining the determined distances (Col.17, lines 15-48).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include step of obtaining information regarding at least part of a human being as taught by Bullister in a broad band transmitted radiation of Altes in view of Barrett for the purpose of providing a method to transform the signals corresponding to measured rotations of the ball about arbitrary axes into signals corresponding to rotations about Cartesian (x, y, and z) axes. (Bullister, Col.3, lines 55-63).

11. Claims 53-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Altes (USP 4,042,928) in view of Kim et al. (USP 5,867,146).

Regarding claims 53-55, Altes teaches the method for transmitting signals, the method comprising the steps of emitting the selected output signal by means of the emitter, receiving an input signal by means of a receiver, determining a transformed input signal by transforming said input signal by means of a predetermined linear transform, comparing the transformed input signal with a predetermined set of original signals, each of said original signals being equal to one of said output signals of the predetermined set of output signals being

Art Unit: 2863

emitted and received noiselessly with a known channel gain and being transformed by means of said linear transform as discussed in claim 1 above.

Altes fails to disclose step of converting means for converting the determined channel gain(s) into a three dimensional position of an object, and for converting said three dimensional position into a position of the pointing device, data communication means for communication between the pointing device, wherein the data communication means is wireless, wherein the object is at least part of a human being.

Kim et al. teach the signal receiving means in a three dimensional wireless pointing device, a microcomputer 50 for using intensities of the infrared signals digitized in the spatial position analyzing means 40 and phases of the ultrasonic wave signals in obtaining X, Y, Z coordinates of a position for determining a relative three dimensional position between the position pointing means 10 and the detecting means 30 (Fig. 5)(Col.5, lines 1-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a three dimensional wireless pointing device as taught by Kim et al. in a broad band transmitted radiation of Altes for the purpose of providing a pointing device which can calculate coordinates and control a position of a cursor in a three dimensional space (Kim et al., Col.1, lines 6-9).

Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Altes (USP 4,042,928) in view of Kim et al. (USP 5,867,146) as applied to claims 53 above, and further in view of Bullister (USP 6,172,665).

Regarding claim 56, the combination of Altes and Kim et al. discussed supra, disclose the claimed invention except the object is at least part of a human being.

Bullister teach in view of the fact that typical rotation sensitivities of trackballs are measured in thousandths of an inch, this transformation error is not significant in comparison to that introduced by the human hand (Col.12, lines 20-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the object is at least part of a human being as taught by Bullister in a broad band transmitted radiation of Altes in view of Kim et al. for the purpose of providing a method to transform the signals corresponding to measured rotations of the ball about arbitrary axes into signals corresponding to rotations about Cartesian (x, y, and z) axes. (Bullister, Col.3, lines 55-63).

Allowable Subject Matter

12. Claims 12-13, 16-18, 38-40, 43-44, 46-47, 48-50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 12, none of the prior art of record teaches or suggests the combination of a method for determining the channel gain(s) between one or more emitter(s) and one or more receiver(s), the method comprising the steps of determining a transformed first input signal by transforming said first input signal by means of a predetermined linear transform, wherein the step of determining a

Art Unit: 2863

transformed first input signal is performed by using a Rudin-Shapiro transform. It is these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 16, none of the prior art of record teaches or suggests the combination of a method for determining the channel gain(s) between one or more emitter(s) and one or more receiver(s), the method comprising the steps of determining a transformed first input signal by transforming said first input signal by means of a predetermined linear transform; determining the original first signal from an obtained measure of noise applied to the first input signal, wherein said measure of noise is obtained from a comparison of a prior transformed first input signal and the respective prior original first signal. It is these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 18, none of the prior art of record teaches or suggests the combination of a method for determining the channel gain(s) between one or more emitter(s) and one or more receiver(s), wherein the method comprising the steps of determining a transformed first input signal by transforming said first input signal by means of a predetermined linear transform; choosing a suitable transform for transforming the first input signal, said step being performed prior to the step of determining a transformed first input signal, the choice being made based on a previously obtained measure of noise applied to the first input signal. It is these limitations as they are claimed in the combination, which have not

• been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 38, none of the prior art of record teaches or suggests the combination of a method for determining the channel gain(s) between one or more emitter(s) and one or more receiver(s), wherein the method comprising the steps of determining a plurality of transforming each of the input signals of said plurality of input signals by means of a predetermined linear transform; determining a plurality of channel gains by means of comparison of said plurality of transformed input signals with each of a plurality of predetermined original signals each being equal to one of said plurality of output signals being emitted and received noiselessly and with a known channel gain, wherein the predetermined original signals are linearly independent; determining the position of an object based upon the determined channel gains, wherein the position of the object is determined in three dimensions, wherein the step of determining the position of an object comprises the steps determining relative distances of the object, said relative distances being based upon the determined channel gains, converting the relative distances into a three dimensional position. It is these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 43, none of the prior art of record teaches or suggests the combination of a method for determining the channel gain(s) between one or more emitter(s) and one or more receiver(s), wherein the method comprising the

Art Unit: 2863

steps of determining a transformed first input signal by transforming said first input signal by means of a predetermined linear transform; determining a first channel gain by means of comparison of said transformed first input signal and a predetermined original first signal being equal to said first output signal being emitted and received noiselessly with a known channel gain and being transformed by means of said linear transform; detecting the presence of an object in the vicinity of at least one of the one or more emitter(s) and/or in the vicinity at least one of the one or more receiver(s) by means of comparing the determined channel gain with a predetermined threshold value, performing a predetermined action in case the determined channel gain exceeds said predetermined threshold value. It is these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 46, none of the prior art of record teaches or suggests the combination of a method for determining the channel gain(s) between one or more emitter(s) and one or more receiver(s), wherein the method comprising the steps of determining a transformed first input signal by transforming said first input signal by means of a predetermined linear transform; wherein the step of emitting a first output signal is performed by using a movable emitter, and wherein the step of receiving a first input signal is performed using at least three substantially stationary receivers, the method further comprising the steps of determining the mutual ratios between the determined channel gains, and determining the position of the emitter by combining the determined ratios. It is

Art Unit: 2863

these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 48, none of the prior art of record teaches or suggests the combination of a method for determining the channel gain(s) between one or more emitter(s) and one or more receiver(s), wherein the method comprising the steps of determining a transformed first input signal by transforming said first input signal by means of a predetermined linear transform; inserting a time delay before the step of emitting the first output signal, determining the contribution of the received input signal from other sources than the first output signal, reducing said contribution of the received output signal. It is these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Contact Information

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Le whose telephone number is (703) 605-4361. The examiner can normally be reached on Monday to Friday from 9:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. John Barlow, can be reached at (703) 308-3126. The facsimile number for Technology Center 2800 is (703) 308-5841.

Art Unit: 2863

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist of the Technology Center whose telephone number is (703) 308-0956.

John H. Le

Patent Examiner-Group 2863

May 7, 2003



John Barlow
Supervisory Patent Examiner
Technology Center 2800